

SAGE III MESOSPHERIC OZONE RETRIEVAL

Pi-Huan Wang¹ and Allan D. Risley²

1. Science and Technology Corporation, Hampton, VA
2. Science Applications International Corporation, Hampton, Virginia

Abstract

To measure the vertical distribution of mesospheric ozone, the satellite instrument of the Stratospheric Aerosol and Gas Experiment (SAGE) III is equipped with a channel centered at 290 nm. The solar occultation technique employed by the instrument allows for two measurements per orbit, one during spacecraft sunrise and another during spacecraft sunset. The instrument is to be launched in the next year.

At a wavelength of 290 nm, the limb atmospheric optical depth is determined primarily by Rayleigh scattering due to air molecules and absorption by ozone. To quantify ozone amount, it is thus necessary to remove the molecular contribution. Removal of the molecular contribution can be achieved via one of two options. The first method uses density information derived from the temperature-pressure profile, which is obtained from the SAGE III oxygen A-Band measurements. The second method exploits the fact that for altitudes above about 40 km, the SAGE III measurement at 385 nm is due almost entirely to scattering by air molecules.

In this report, we will discuss SAGE III mesospheric ozone retrieval in detail, and illustrate how the 385-nm channel data can be used for ozone retrieval at altitudes above 40 km by using SAGE II observations as an example. In addition, we will present the long-term density record at 45.5 and 50.5 km from the SAGE II 385-nm measurements between 1984 and 1996.